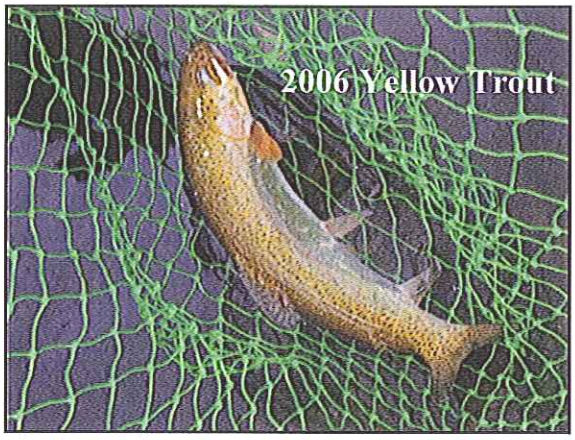
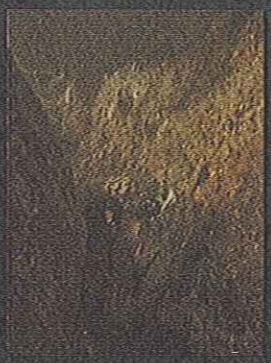
Malibu Creek
Water Quality Monitoring

In response to fish die off in 2006 and decline in 2009
Presented by
Rosi Dagit, RCD of the Santa Monica Mountains





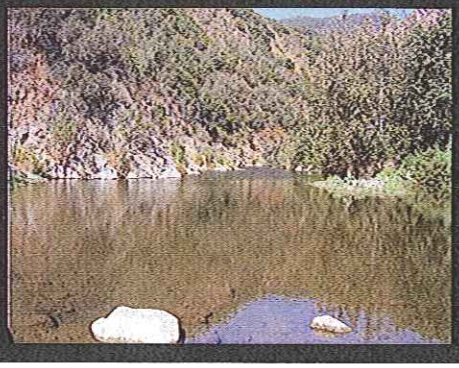
2009 decline

Start Pool Probe

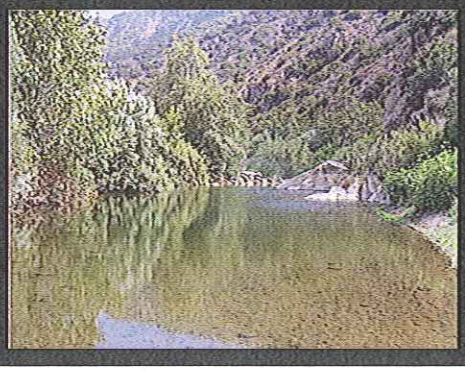
Data probe logger and computer connection

Hobo temperature loggers

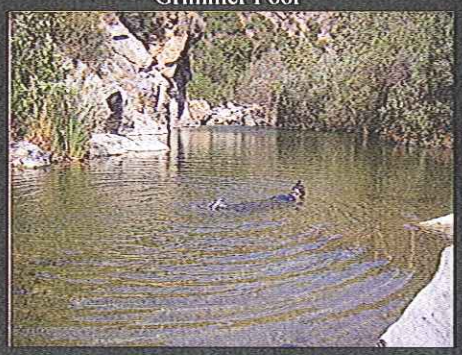
Lower Twin Pool, Malibu



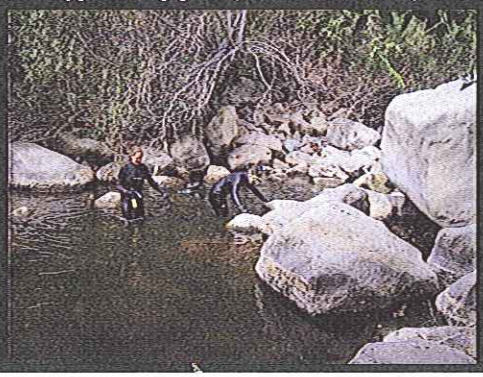
Lunch Pool



Grimmer Pool



Typical step pool (above Tufa Rock)



Big Wide Pool

Dam Pool, August 2006

Timeline of Die Off

- May 2006 - 245 trout of all size classes
- June 2006 - no survey due to NZMS
- July 2006 - 37 yellow trout under 6"
  145 normal trout of all size classes
- August 2006 - 73 yellow trout, 36 normal
- Sept. 2006 - 7 yellow trout, 2 normal
- Sept. 26 - 3 trout captured for pathology
- October 2006 - 2 normal trout
- November 2006 - No trout

Questions asked

- Why are the trout turning yellow but other species are not?
- Is this a response to a pollution event?
- Is this a response to application of Bt?
- Was there an unusual water quality problem?
- Could this have something to do with the NZMS invasion or other macro-invert issue?
- What role does the thick layer of "muck" play?
- Why did it take longer for the other fish species and crayfish to die off?

Pathology and Histology Results

Thanks to Joe Maret et al

- 3 trout were examined alive and then sacrificed
- 1 had unusual bacterial infection of gills
- 11" female gut filled with green algae
- Nothing else remarkable noted
- Otoliths damaged in formalin and not able to be analyzed

Pollution Event?

Thanks to Randal Orton and LVMWD

- No physical evidence of any spill
- Copper sulphate used in Malibu Lake in June but no evidence found downstream
- Water sample collected by LVMWD in Sept. 2006
- No toxics found

Bt Application?

M6: 05 Aug-Dec,
06 May-Aug
M7: 05 Sep - Nov
M9: 05 Aug
M10: 05 Aug
M11: 05 Jul, Sep-Nov
06 Jun- Aug

- Volume applied 1.03-2.06 pints per event

Water Quality

Thanks to LVMWD and HTB

- Water Temp ranged from 15.98 in May to 29.16 in late July
- No DO readings from early morning taken, mid-day is over 10mg/l
- Nitrates-N = 0 ppt
- Ammonia- N= 0.35 ppt
- Phosphates = 0.56 ppt

*All of these are within range typically found in Malibu(HTB data)

- Steelhead Tolerances:

Temp tolerances:
4-11.5°C
Fry 7.5-15.5°C
Up to 28°C

DO range: 8-13 mg/l

All could be stressors but do not appear sufficiently different from previous years to be considered primary causal agents?

Mudsnails and Macro-Inverts

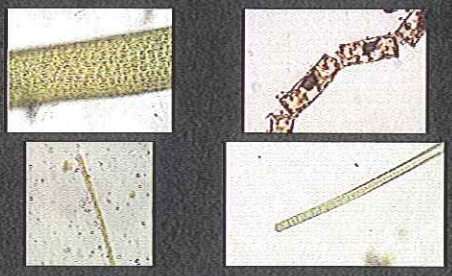
Thanks to Mark Abramson

- NZMS documented in whole reach below dam to Serra Crossing
- Few other bug species noted this year, striders, boatman, etc.
- Macro-invert sample collected in May 05 and Dec 06
- No results yet from 06 sample
- Don't know what this means to trout and other fish food supply

Malibu Muck

Samples examined by Robert Gilbert, UCLA and Dr. Robert Sheath, Cal State San Marcos

Muck components non-toxic diatoms that indicate a diverse community of both high and low ion taxa like *Enteromorpha clathrata, Pleurosira laevis, Phormidium retzii* and *Oscillatoria tenuis*

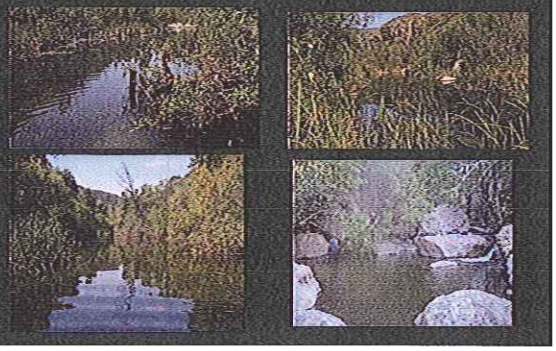


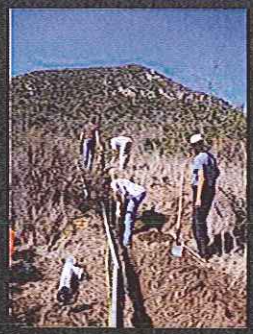
Why did the trout turn yellow? WHAT NEXT?

- Does the pattern of small fish illustrating the problem, followed by all size classes over a 2 month time frame indicate a pathogen?
- Could this be a bio-toxin like a dinoflagellate?
- Could the tolerance of the other invasive species account for their decline following the trout?
- Does this pattern seem indicative of reaction to some other disease?
- Could we potentially spread this to other creeks?
- What additional tests do we need to do?

2009 decline event

2010 sondes in 4 locations control site in Topanga



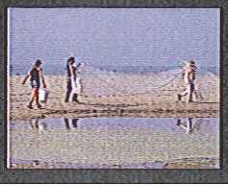


2011 continuously recording probe connection installed

Established umbrella goal of preserving and restoring Southern Steelhead Trout and Tidewater Goby

- Initiated monthly smolt surveys in June 2001
- Habitat mapping completed from the ocean to the town (5000 meters)
- Migration trapping during storm events
- Monitored passage opportunities at the lagoon (all funded by CDFG)
- Examined the role of seeps and springs in providing refugia habitat (GeoFlotech 2006, Tobias, 2007)
- Researched historic use (Dagit, et al 2005)
- Calculated fish passage opportunities using CDFG model
- Santa Monica Mountains Steelhead Habitat Assessment Draft Project Report (CalTrout 2006)

Fish Monitoring



PIT tagging Trout

Smolts and Anadromous Adults

Smolts observed rarely

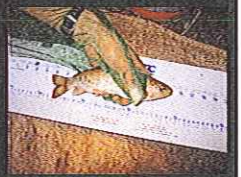
Anadromous Adults (>20 inches) observed:

2001- 1, 2002-2, 2003-1,

2004-2005 none

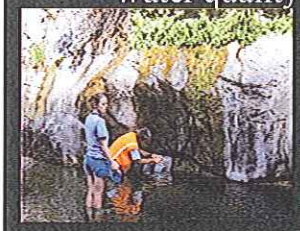
2006-1, 2007 -2, 2008-1, 2010-1

Trapping Trout



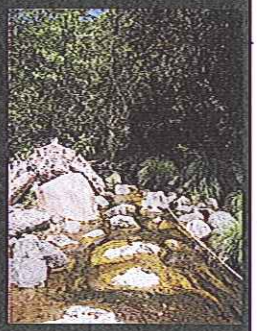
Instream Antenna

Water quality monitoring



Unwelcome invasives

Frog Counting



BAT Monitoring

Turtle Trapping

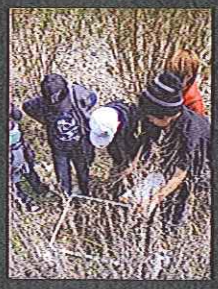
Creek Clean Ups – before and after

Revegetation and weed control



FIELD based Education Programs





Variety of Educational Opportunities for Elementary, AP High School, College, Community groups




Thank You